PULMONARY EMBOLISM
HOW TO MAKE THE DIAGNOSIS?

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Worldwide Pulmonary Embolism is a major health problem. It may be the cause of sudden death or chronic disability. Advances have been made in the diagnosis and management of this disorder in past decade or so. Even in 1996 identification of P.E. remains a challenge to clinicians. This article describe the current diagnostic strategy for Pulmonary Embolism.

Key Word: - Pulmonary Embolism
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SIZE OF THE PROBLEM

It is estimated that in USA about 600,000 cases of P.E. occur each year and out of them 100,000 die (1) due to lack of autopsy studies and non availability of various diagnostic test it is not possible to have a true estimate of the incidence of P.E. in Pakistan. There is no reason why it should not be as common as reported in the Western world. It is certainly the most important cause of sudden unexplained death in hospitals.

IS TREATMENT EFFECTIVE?

If P.E. is diagnosed and properly tracked then mortality is only 8%. Failure to make a diagnosis would result in mortality of about 35% (2). In Pakistan lot of people die because of P.E. This mortality could be markedly reduced by early diagnosis and prompt treatment.

WHO IS AT RISK OF DEVELOPING P.E.

1. Post Operative States
2. Injury to lower limbs
3. Older age
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4. Immobilization
5. Oral contraceptives
6. Malignancy
7. Hypercoagulable state e.g. multiple myeloma, nephrotic syndrome, antithrombin III deficiency.

This is important to remember that at least 20-30% of P.E. occur in ambulatory patients with no known risk factor. Prolonged airflight have now been included as another risk factor for P.E.

CLINICAL PRESENTATION

3 SYNDROMES ARE RECOGNIZED

1. Acute minor P.E. - (Dyspnoea, Chest Pain)
2. Acute major P.E. - (Hemoptysis, Hypotension)
3. Chronic Thromboembolism Pulmonary Hypertension

The classical triad of symptoms in P.E. are Dyspnoea, pleuritic chest pain and hemoptysis but this is only present in one fifth of patients
with major pulmonary embolism (3) It is worth remembering that P.E. may present as acute Asthma (4) or pulmonary Oedema (L.V.F) (5). Pulmonary infarction may be mistaken as pneumonia.

Symptom of P.E. are nonspecific and can mimic various diseases. High index of suspicion is required in making a diagnosis of this disorder. P.E. should be suspected in all patient who present with unexplained dyspnoea, hemoptysis or pleuritic pain.

In massive P.E. there may not be any warning and patient may die suddenly because of blockage of major pulmonary artery by a blood clot.

**PHYSICAL SIGNS IN P.E.**

Tachypnoea, crackles, loud pulmonary component of 2nd sound, Elevated Temperature, Tachycardia are the usual physical signs in P.E. None of them are reliable enough to make a definite diagnosis.

**WHAT INVESTIGATIONS TO DO IN PATIENTS WITH SUSPECTED P.E.**

1. **ECG:**

   ECG changes are seen in minority of patients. These changes apart from tachycardia include;

   1. $S_1 Q_3 T_3$ pattern
   2. R.B.B.B. (Right Bundle Branch Block)
   3. P. Pulmonale
   4. Right axis deviation
   5. T inversion in anteroseptal leads.

2. **CHEST X-RAY:**

   Chest x-ray may be normal or shows pleural effusion, raised hemidiaphragm, linear atelectasis or pulmonary infiltrates. It is important to remember that infract are rarely wedge shaped, chest x-ray is more helpful to look at alternate diagnosis rather than to make a diagnosis of pulmonary embolism.

3. **ARTERIAL BLOOD GAS ANALYSIS**

   Typical finding on arterial blood gas analysis is presence of hypoxemia and hypocapnia (low PaO$_2$ and low PaCO$_2$). It is important to note that Normal PaO$_2$ does not rule out P.E. In one study 10% of cases of acute massive pulmonary embolism had PaO$_2$ above 80mm of Hg (7).

   A-a oxygen gradient = 14 [1.2 (PCO$_2$) + measured PaO$_2$]. A normal gradient should be no higher than 10 plus one tenth of patient age (8) while majority of patient with P.E. would have high A-a gradient this is a nonspecific finding and may occur in many other pulmonary diseases.

4. **VENTILATION PERFUSION SCAN (V/Q SCAN):**

   This is the most important investigation that one should do in suspected P.E. Unfortunately there are very few centers in Pakistan who are able to carryout this test. Some centers only have the facility of perfusion scan.

   A normal perfusion scan practically rules out the diagnosis of significant P.E. Large perfusion defects in the absence of any corresponding ventilation is highly suggestive of P.E. Patient with chronic lung or cardiovascular disease may shows false +ve V/Q scan results.
5. **VENOUS IMAGING:**

In a patient with S/S suggestive of P.E. presence of deep vein thrombosis either by contrast venography or Duplex ultrasound virtually proves the diagnosis of P.E. A negative imaging however does not exclude this diagnosis.

6. **PULMONARY ANGIOGRAPHY:**

Pulmonary angiography remains the “GOLD STANDARD” test for the diagnosis of P.E. This procedure is invasive but has unmatched sensitivity and specificity. The risk of this procedure is far less than the risk of missed pulmonary embolism. Once again this investigation is not freely available in Pakistan.

7. **NEWER TECHNIQUES IN THE DIAGNOSIS OF P.E.:**

i. **D-Dimer Measurement:** D-Dimer is a fibrin degradation product released into the circulation when fibrin undergo lysis. This level is said to be raised in patients with P.E. (9). Its absence has been reported to have a negative predictive value of 91%.

ii. **C.T. Scan of Chest:** Special C.T. scan of chest using a spiral (helical) scanner has recently been shown to be a some value in detecting pulmonary embolism. This scan is still under trial at present time (10).

**CONCLUSION**

Diagnosis of Pulmonary Embolism remains challenging even in this day and age. Absence of reliable signs and symptoms put a clinician in a difficult situation to make or refute the diagnosis. High index of suspicion is required to make the diagnosis of this condition. P.E. should be considered in any unexplained pleuritic chest pain, dyspnoea or hemoptysis. Doing appropriate investigations and treating this condition would save thousands of lives.

**REFERENCES:**


